Next Generation Identification (NGI)

Technical Specifications Document for the Iris Pilot (IP) Project

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Prepared by:

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CHANGE DESCRIPTION FORM

Revision	Change Description	Created/Changed by	Date	Approved By
2.6.4	Iris Recognition Pilot (IRP) to Iris Pilot (IP). IIDS/SRE 2.018 NAM field mandatory. Synchronizing IP TOTs with EBTS 10.	Mark Parsons	11/5/13	
2.6.5	Removed ERRI from FIS responses. Restricted 17.025 EAS field values. Added ELR to BID of IRQ submission.	Mark Parsons	3/26/14	
2.6.6	Fixed BDEL field requirements. Added missing images error message. Corrections to examples. Field 17.019 MMS is mandatory with image.	Mark Parsons	11/17/14	
2.6.7	Type-17 example for image and no image configurations. Note about BIL deviation from EBTS. IRQ synchronization with EBTS.	Mark Parsons	3/23/15	

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1 INTRODUCTION

The Iris Pilot (IP) offers iris recognition services to law enforcement partners for criminal justice purposes. Iris Pilot participants are required to complete an Iris Pilot Participation Memorandum of Understanding (MOU) with the FBI/CJIS Division.

Implementation of the pilot will validate use of the existing search and response transactions and will help to identify any additional transactions or modifications that may be needed. The pilot will also help to identify and address operational business challenges that might arise in integrating iris recognition into NGI, and in adding iris collection to booking scenarios. The Iris Pilot will also provide an opportunity to implement, assess, and recommend possible refinements to the following products being developed by the National Institute of Standards and Technology (NIST): best practices for iris image capture, iris camera certification requirements (similar to FBI Electronic Biometric Transmission Specification (EBTS) Appendix F for fingerprint capture devices), specifications for iris image compression (especially optimal settings for use of JPEG 2000), and an open source iris image quality metric[1]. Pilot results will benefit the FBI's user and vendor stakeholders.

The initial iris repository was compiled from a variety of law enforcement and national security related organizations with ongoing collection of legacy data and live enrollments. This requires a bulk enrollment capability. For legal and privacy purposes, each set of iris images enrolled in the repository will be associated with an FBI Number/Universal Control Number (2.014 FBI/UCN). A Bulk Enrollment MOU must be completed prior to submission of bulk data.

It should be noted that the transaction and field specifications used in this document are primarily based on FBI Electronic Biometric Transmission Specification (EBTS) version 10.0 and ANSI/NIST-ITL 1-2011. FBI/CJIS has updated or drafted new transactions and fields for EBTS 10.0. Particularly where such updates support NGI's emerging iris recognition capability, the corresponding specifications also apply to and have been incorporated into the IP technical specifications.

[1] Quality metric is being developed in conjunction with ISO/IEC JTC 1/SC 37, 29794-6, Biometric sample quality – Part 6: Iris image data.

2 SCOPE

This document outlines the technical concepts, specifications, and boundaries for the Iris Pilot enabling partner agency participation. This document also defines the types of iris search transactions that are accepted, the types of responses returned to contributors, definitions for system performance, and availability anticipated for the Iris Pilot. The possible *fusion* of face and/or fingerprint searches with iris searches are beyond the scope of this pilot.

One goal of the Iris Pilot is to determine how to best structure iris searches and the information returned in response. Therefore, the FBI *Electronic Biometric Transmission Specification* (EBTS) fields used for transactions may change throughout the life of the Iris Pilot. These changes may not yet be reflected in the latest published version of the FBI EBTS. Although the IP technical specification contains excerpts from the FBI EBTS and the American National Standards Institute/National Institute of Standards & Technology (ANSI/NIST) — *Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information*, it does not provide the same level of detail contained in these documents. These documents must therefore be used together to fully understand Iris Pilot transactions.

This document assumes familiarity with NGI/IAFIS transactions and focuses on refinements to the Type-2 and Type-17 records required to enable automated iris recognition in NGI.

2.1 Pilot Implementation and Use Cases

The following classes of implementation have been identified for the Iris Pilot:

- Correctional Facilities Currently Using Iris Recognition
- Correctional Facilities Not Currently Using Iris Recognition
- Supervised Release
- Sex Offender Registration
- Identification in Court
- Iris Image Investigation Search

Correctional facilities sharing their iris data with the FBI/CJIS will facilitate the capability for cross-facility searches, such as when transferring inmates between facilities, and also facilitate the FBI's creation of a national-level iris image repository.

Depending on the specific application, iris image capture might best be achieved with either fixed or handheld mobile iris capture devices. Feedback from Iris Pilot participants in this regard will help to support the documentation of iris capture best practices.

2.1.1 Correctional Facilities Currently Using Iris Recognition Locally

Facilities that currently have iris recognition systems apply their *local* capability to various use cases including one or more of the following:

- Monitor entry, location, and egress of inmates, staff, and visitors
    - Permit only authorized individuals to enter or exit a facility
    - Account for who is in a facility in the event of an emergency
    - Accurately identify inmates and assure that only the correct individual is released
    - Accurately identify inmates for special cases such as to permit temporary exit to and subsequent return from a facility to obtain skilled medical care, or likewise, to participate in community work crews
- Assure the identity of an inmate who is appearing in court
- Assure that medical care and medications are administered within the correctional facility to the proper individual

Beyond their current, local capabilities, facilities participating in the Iris Pilot, by virtue of the FBI's *national* scope, will be afforded a broader capability to assure the identity of an incoming inmate who is being transferred from another facility that has placed its data in the NGI Iris Pilot iris image repository.

2.1.2 Correctional Facilities Not Currently Using Iris Recognition

Participation in the Iris Pilot will support and facilitate the implementation of iris recognition in facilities not currently using this technology. At a minimum, participation in the pilot will afford access to the IP Repository as well as the ability to assure the identity of an incoming inmate who is being transferred from another facility that has placed its data in the IP Repository. Pilot participants, if they wish to do so at their own expense, may implement a *local* iris recognition capability and implement applications such as the bulleted items noted in 2.1.1 above.

2.1.3 Supervised Release/Probation

Supervised release/probation officers may use iris recognition as a highly reliable, quick, and automated method for check-in of individuals on supervision. Individuals on supervision would require less interaction with the officer and the officer could focus more attention on other important matters. A search of the IP Repository could be used to verify the identity of an individual whose iris images have been enrolled previously.

2.1.4 Sex Offender Registration and Check-in

Some jurisdictions have been implementing sex offender registries based on iris recognition. Sex offenders are required to register with local authorities and notify local communities in all 50 states, and depending on their classification level, are required to report to local authorities several times per year.

Iris recognition facilitates identity verification during sex offender check-ins with local authorities. The iris check-in process is mobile in some cases and takes place at the sex

offender's residence with a mobile iris recognition device. At this time, IP does not provide a service relating to local application of sexual offender registration and tracking.

2.1.5 Identification in Court

When incarcerated individuals are required to appear in court, a search of the IP Repository could assure the identity of an individual whose iris images have been enrolled previously.

2.1.6 Iris Image Investigation Search

The potential need exists to search an iris image that has been segmented from a face image obtained from a high resolution surveillance photo or a photo discovered on a cell phone or other electronic device or media found at a crime scene. Such a photo might be the result of visible, infrared, or another spectrum of light illumination. Approaches and best practices for this type of iris search are current research topics within the biometrics community, and so the utility of such searches, while promising, is still to be determined. Therefore, this functionality is only to be used on a limited basis.

2.2 Data Exchange

2.2.1 Information Security

NGI is bound by many internal Federal Bureau of Investigation (FBI) Criminal Justice Information Services (CJIS) Division security policies. The Iris Pilot must follow these same security policies. All participants in the Iris Pilot are expected to comply with all security policies related to the dissemination and use of CJIS data.

2.2.2 Transfer Protocol

Iris Pilot search requests must be submitted over the CJIS Wide Area Network (WAN) as Multipurpose Internet Mail Extensions (MIME) encoded e-mail attachments via Simple Mail Transfer Protocol (SMTP). The Iris Pilot will not support Extensible Markup Language (XML) EBTS web service requests.

2.2.3 Transaction Routing

Iris Pilot search request and enrollment transactions from state and local agencies are routed in the same manner as fingerprint search requests – through the contributor's state information bureau (SIB) or other authorized agency. Iris Pilot transactions from federal agencies are routed in the same manner as currently used for fingerprint search requests. Responses to each Iris Pilot transaction will be routed in the reverse of the submitted transaction.

2.2.4 Originating Agency Identifier (ORI)

Iris Pilot search request and enrollment transactions use the existing ORI of the submitting agency.

2.2.5 E-Mail Address

For most agencies, Iris Pilot transactions are sent to the same email address an agency uses to communicate with IAFIS/NGI. Agencies should confirm the destination email address with CJIS Division before attempting to send pilot transactions.

2.3 General Policies and Guidelines

2.3.1 Dual versus Single Iris Submissions

2.3.1.1 Enrollment

Two Type-17 records shall be submitted for each enrollment. Enrollment of left and right iris images is recommended, but a single iris image may be submitted if a subject has only one natural eye or another reason precludes the imaging of two irises. When an iris cannot be captured the reason for such occurrence will be provided using field 17.028 Damaged or Missing Eye (DME) and field 17.999 Image Data (DAT) shall then be absent for the pertinent eye. See Type-17 Record Sample Page C-16 for exact Type-17 record configurations. If a previously unavailable iris is able to be imaged a Biometric Image Submission (FIS) transaction can be used to add the iris or irises to the enrollment record.

2.3.1.2 Searching

When dealing with good quality probe and gallery iris images, research has shown the matching of a single iris image to be highly accurate; the increase in accuracy of searching left and right iris images over a single image is not as great as searching, for example, left and right index fingerprints vs. a single index fingerprint.[2] However, searching a single iris provides a chance for a "clean miss"; for example, if an individual is enrolled using only the left iris and a search is performed using only the right iris, the individual will not be returned. For this reason searches should be performed with both eyes if possible. When an iris cannot be captured the reason for such occurrence will be provided using field 17.028 Damaged or Missing Eye (DME) and field 17.999 Image Data (DAT) shall then be absent for the pertinent eye. See Type-17 Record Sample Page C-16 for exact Type-17 record configurations. The identification service allows searching with one or two iris images per transaction. The investigative service requires a separate transaction for each image searched.

2.3.1.3 Failure to Template

When all iris images in a submission fail to template (typically due to poor image quality) an error transaction is returned with the IRP003 – "Unable to generate template" error message. For dual iris submissions where a single iris image fails to template, the requested action (enrollment or identification search) is attempted and a response transaction (i.e. Biometric Image

[2] Grother, P., Quinn, G. W., Matey, J. R., et al., *IREX III – Performance of Iris Identification Algorithms*, NIST Interagency Report 7836, April 9, 2012, p. 57.

Submission Response (FISR) or Submission Results - Electronic (SRE) respectively) is returned to the user. The response transaction will contain the IRP003 – "Unable to generate template" error message with the failed eye label in the Status/Error Message (2.060 MSG) field. The operator should recapture the iris images and resubmit via a FIS for enrollment or Iris Image Identification Submission (IIDS) for identification search.

2.3.2 Criminal Justice Purposes

Iris Pilot search requests should be for Criminal Justice Purposes only.

2.4 Iris Pilot Searches

All searches of the IP Repository will be one-to-many searches. In this document, the term "ident" refers, in general, to when an iris probe image has been deemed to match an iris image that has been enrolled in the IP repository.

Section 5 of this document contains the specifications for IP search transactions and their associated responses.

2.4.1 Iris Image Identification Search

An IIDS will be used to determine a biometric identification decision. A search that results in a score better than a predetermined match threshold will be deemed a match. By default, IIDS searches that result in a match will not return any images. If a face image was enrolled previously with the matching iris image, the face image will be returned only if requested using the Request Photo Record field (RPR 2.096).When working with good quality probe and gallery images, it is highly unlikely that a search will result in more than one candidate with a score better than the match threshold. If any such events result, they will be adjudicated through a manual exception handling process.

Each identification search response includes the following caveat in the 2.088 Note Field.

> ***This response is based on a search of only the Iris Pilot (IP) iris image repository and does not preclude a record from existing in other biometric or name based repositories. Users are permitted to rely on the IP response in conjunction with other law enforcement tools but shall not rely solely on the IP response for additional law enforcement action.***

2.4.2 Iris Image Investigative Search

Investigative iris searches can be performed using the Iris Image Investigation Search (IIIS) transaction. However, the accuracy of such searches is unknown at this time. Investigation searches are not associated with a predetermined match threshold. Rather, iris images for up to the 50 best scoring match candidates, per user request, will be returned for submitter review.

Each investigative search response includes the following caveat in the 2.088 Note field.

> ***The candidate identities returned from an IIIS in the resulting SRB response shall be considered potential candidate matches or investigative***

leads requiring further verification. Users should not rely solely on IIIS search responses as the impetus for any law enforcement action. Instead, search results serve as potential links between submitted images and true identities that must be independently verified.

2.4.3 Use of Biographic Data

For the Iris Pilot, biographic data such as age or gender will only be used to reduce the size of the search gallery or to filter search results in Investigative Iris Searches; Iris Pilot Identification Iris Searches will be image only. It should be noted that such filtering may limit the accuracy of the results achieved. Including metadata in the identification search logic may be explored in the future to support the search of poor quality iris images or other applications.

2.5 Iris Pilot Enrollments

The Iris Pilot supports three methods of enrollment: submission of iris images with Criminal Tenprint Submission – Answer Required (CAR transactions), Biometric Image Submissions (FIS transactions), and bulk enrollment of legacy data by FIS transaction.

2.5.1 Primary Enrollment Method – Criminal Tenprint Submissions

Inclusion of iris images with CAR booking transactions is the preferred enrollment method. When iris images are captured with a booking no additional data entry is normally necessary. If one or more eyes is missing or cannot be captured the missing eye(s) should be marked appropriately using the 17.028 DME field.

2.5.2 Secondary Enrollment Method – Biometric Image Submissions

When iris images have not been captured at booking time or additional iris image enrollments are advantageous they can be submitted later using a FIS transaction. Two Type-17 records and at least one iris image are required. Additionally the subject FBI Number/UCN and Date Printed (DPR) must be provided. If available, the Event Identifier (EVI) should also be provided.

2.5.3 Legacy Data Enrollment Method – Bulk Biometric Image Submissions

Bulk enrollment of legacy data must be coordinated with CJIS prior to submission. The FIS transaction used for Iris Pilot enrollment will also be used for bulk enrollment. If only one iris image is available the second Type-17 record shall be marked "UC" (unable to capture image).

2.6 Iris Pilot Responses

Section 5 includes the specifications for Iris Pilot search response transactions. Search processing is automated, with no manual interaction.[3] During the pilot phase, relevant

[3] For the Iris Image Identification Search Request (IIDS) transaction, in the unlikely event that multiple candidates score better than the iris match threshold, this occurrence will be flagged for follow-up and analysis by CJIS staff.

transactions are analyzed by the parties and their authorized contractors to assess system performance. Iris Pilot system design will be refined based on lessons learned and user input.

Response times are measured from the time a request is received at the CJIS firewall until the response is returned to the CJIS firewall. Transmission times and delays from the wide area network can be characterized using network measurement tools. Table 2-1 provides maximum anticipated response times per TOT indicated, with typical response times expected to be shorter. It is expected that iris search results will be returned in under 15 minutes, with typical search response times expected to be less than one minute.

Table 2-1 Maximum Response Times per Transaction

Type of Transaction (TOT)		Maximum Response Time
Mnemonic	Description	
FIS	Biometric Image Submission	15 minutes
IIDS	Iris Image Identification Search Request	15 minutes
IIIS	Iris Image Investigation Search Request	15 minutes
IRQ	Biometric Image/Feature Retrieval Request	5 minutes
BDEL	Biometric Delete Request	15 minutes
CAR	Criminal Tenprint Submission (Answer Required)	See EBTS
CNA	Criminal Tenprint Submission (No Answer Necessary)	See EBTS

2.7 Iris Pilot Specific Behavior

The IP is designed to work as seamlessly as possible with existing standards and CJIS services. However pilot specific behavior is still necessary and attempts are made to document any behaviors or standards modifications that implementers need to consider.

2.7.1 Two Responses for Criminal Tenprint Enrollments

Normally sending CJIS a criminal tenprint submission (CAR) results in a single response (SRE/ERRT). When iris images are included a second response (FISR/ERRA) is returned after a successful CAR-SRE response. The iris images are not processed if the CAR fails resulting in an ERRT. The second response provides the status of iris image and mugshot enrollment in the IP. This behavior is expected to change back to a single response after the pilot.

2.7.2 Biometric Image Submission (FIS) Format

The format of the Biometric Image Submission (FIS) for the IP differs from the EBTS 10.0 FIS in several ways. The IP FIS does not allow Type-4, Type-14, or Type-15 records. Type-10 records are limited to a single front facing mugshot. Two Type-17 records are required.

2.7.3 Additional Fields in Identification Search Response

The 2.088 Note Field (NOT) and 2.2033 Supplementary Identity Information (SII) fields are included in the SRE sent in response to an IIDS transaction which differs from the SRE used in response to other transactions (including the CAR enrollment of iris images).

2.7.4 Additional Information Item – Eye Label

An additional information item to hold the eye label has been added to the 2.2028 BID field for the IRQ and the 2.2033 CNL field for the SRB resulting from an IIIS. This information item functions identically to the 17.003 Eye label (ELR) field.

2.7.5 Effective Acquisition Spectrum Restriction

The IP does not allow use of the value "DEFINED" for the 17.025 Effective Acquisition Spectrum (EAS) field. See also 4.4.5 Iris Image Effective Acquisition Spectrum.

2.7.6 Special BSI and EVI Values

EBTS specifies that the Biometric Set Identifier (BSI) and the Event Identifier (EVI) are numeric fields. For the Iris Pilot these field values may have the letters "IRP" prefixed making the field alphanumeric. This special exception to the format specified in EBTS applies to the Iris Pilot only.

2.7.7 Special Error Messages

The IP has identified the need for several iris specific error messages to be used in the 2.060 Status/Error Message (MSG) field. These error message codes are prefixed with "IRP" and can be found in Table 5-5 Transaction Errors Pertinent to the Iris Pilot. These codes or similar variations may eventually be incorporated into EBTS with proper category prefix letters and an available number in the assigned category.

2.7.8 Biometric Image List (BIL) Deviation from EBTS

The IP populates 2.2073 Biometric Image List (BIL) for iris investigative searches while EBTS states the BIL is only populated for face searches. The IP also allows the 2.2073d Image Type (IMT) information item to contain the value "11" for iris as opposed to EBTS, which only allows "9" for face and "10" for SMT.

2.8 Iris Pilot Availability

Every attempt will be made to maximize the operational availability of the Iris Pilot. However, as a pilot system, there will be times that the Iris Pilot will be taken offline for assessment, upgrades, and maintenance. Whenever practical, pilot participants will be given advance notice of the date, time, and expected duration of such events.

2.9 Search Data Retention

Search data may be logged and retained for future use.

2.10 FBI Support to Pilot Participants

The FBI intends to provide assistance that may be needed to enable an agency to participate meaningfully in the Iris Pilot. Any such assistance will be detailed in an MOU between the FBI and the participating facility. The degree and nature of such assistance will depend upon the participant's familiarity with and current level of iris recognition capability. Assistance to implement a local facility iris recognition capability is beyond the scope of the Iris Pilot.

3 IRIS IMAGE CAPTURE

3.1 General Guidelines

As with other biometrics, the quality of the iris images collected will directly impact matcher performance. It is especially important that the IP Repository be based on images that meet or exceed minimum quality requirements. Within the biometrics community, efforts are in progress to develop iris image capture best practices and an iris image quality metric that correlates directly with the performance of available matchers.

As part of IREX V – Instructional and Guidance Materials for Capture, NIST has developed the recommended *Guidance for Iris Image Collection* document along with a poster and slideshow, which:

- Identifies the applicable standards
- Illustrates guidelines for iris camera placement
- Addresses possible negative impacts on iris image quality of data capture subjects and iris camera operators, and approaches to minimizing such impacts
- Discusses manual and automated approaches to image quality assessment
- Provides photographs of common iris image impairments, the effects of these impairments, and mitigation approaches

NIST Special Publication 500-280 – Mobile ID Device Best Practice Recommendation Version 1.0 (Section 8) provides guidelines for iris image capture using mobile devices. Table 3-1, adapted from that document, summarizes key iris image capture characteristics in terms of three Iris Acquisition Profiles (IAP): 20, 30, and 40. Expected image quality and system performance increases with IAP level.

NIST is also in the process of developing recommended technical specifications for iris capture cameras based on specific use cases.

To the greatest extent possible, all guidelines outlined in these documents are related to the capture and transmission of iris images should be followed with the goal of capturing the highest quality images possible.

Table 3-1 IAP Levels[4]

Capture	Affects	IAP Levels		
		20	30	40
Iris diameter in true, non-up-sampled pixels	Accuracy	≥140 pixel	≥170 pixel	≥210 pixel
Number of (quasi-) simultaneously captured eyes	Capture speed, search speed, accuracy	≥1	≥1	2
Exposure time	Capability to freeze motion	≤33 ms	≤15 ms	≤10 ms
Viewfinder & Image quality feedback	Rate of successful captures	External or Internal	Internal, Optical or electronic	Internal, At least electronic
Capture distance in mm	Intrusiveness, operator safety	≥100		
Capture volume per eye, minimum width / height / depth in mm	Ease of alignment	Regular devices: 11 mm / 9 mm / 20 mm for single-eye capture 19 mm / 14 mm / 20 mm for two-eye capture Device with a mechanical alignment aid: 11 mm / 9 mm / 12 mm for single-eye capture 19 mm / 14 mm / 12 mm for two-eye capture		
Imaging wavelength range and spectral spread	Dependence of accuracy on eye color	700 to 900 nm Sensitivity ≥35% the power in any 100 nm band		
Scan type	Accuracy, compressibility	Progressive		
Image margins in pixels around iris border	Accuracy	See Table 3-2 for updated values per ANSI/NIST-ITL 1-2011		
Image evaluation frame rate	Time to capture and failure to acquire	≥5 frames/s		
Allowable maximum average irradiance	Relevant for eye safety	Governed by Iec 825-1 and ISO 60825-1		
Sensor signal-to-noise ratio	Recognition accuracy	≥36 db		
Interchange				
Pixel depth in 700-900 nm range	Interoperability	≥8 bits/pixel		
Format, iris	Interoperability	Raw Iso 19794-6-rectilinear ANSI/NIST-ITL Type-17		

[4] Adapted from *Mobile ID Device Best Practice Recommendation* Version 1.0, NIST Special Publication 500-280, Table 5, p. 29, August 2009. Note update to "image margins" per ANSI/NIST-ITL 1-2011.

Table 3-2 describes the ISF codes[5], defined in the ANSI/NIST-ITL 1-2011 Standard.

Table 3-2 Iris Margin Requirements Corresponding to Iris Storage Format (ISF) Codes

ISF code	Description	Iris Centering	Iris margin requirement (R is radius of the iris)	
			Horizontal	Vertical
1	Unconstrained image size	Recommended	≥ 0.6R	≥ 0.2R
2	Raw: 640x480	Recommended	≥ 0.6R	≥ 0.2R
3	Cropped	Required	= 0.6R	= 0.2R
7	Cropped and Masked	Required	= 0.6R	= 0.2R

3.2 Iris Images for Investigation

Iris images that will be the subject of investigation searches will most likely be cropped from photos or videos that were obtained with ambient visible light illumination of various levels. Iris images are typically captured using near infrared illumination (NIR) to better discern iris texture, particularly of darkly pigmented irises. Attempting to match iris images captured with visible light illumination to iris images captured with NIR illumination will offer a challenge and require research to determine if such comparisons can be performed effectively. Additionally, IP participants wishing to prepare and submit iris images for investigation will need the ability to obtain images from photo and video source material and crop such images to meet ANSI/NIST-ITL Type-17 requirements.

[5] From NIST Special Publication 500-290 -- *ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information*, Table 22, p. 85.

4 AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)/NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY (NIST) DATA INTERCHANGE STANDARD

Record types 1, 2, 10, 17, which are defined in *ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information* [ANSI/NIST-ITL], Sections 8.1, 8.2, 8.10, and 8.17, respectively, are the primary components for iris-related transactions.

4.1 Type-1 — Transaction Information Record

A Type-1 logical record is mandatory for each Iris Pilot transaction. The Type-1 record shall always be the first record within the transaction. The Type-1 record shall provide information describing type and use or purpose for the transaction involved, a listing of each record included in the transaction, the originator or source of the physical record, and other useful and required information items.

ANSI/NIST-ITL 1-2011, Table 22, provides a detailed list of the fields associated with a Type-1 logical record. Associated with each field is the field number, the field mnemonic and name, "condition" code (e.g., mandatory or optional), character type and number of characters permitted, value constraints, and occurrence limits.

Refer to ANSI/NIST-ITL 1-2011 Section 8.1 and Appendix B of the latest version of the FBI EBTS for a detailed description of the fields used within a Type-1 record.

The Domain Name (DOM 1.013) and Application Profile Specifications (APS 1.016) fields shall be used to facilitate direct routing of transactions to the IP. NGI Criminal Tenprint Transactions that trigger iris enrollments (e.g., CAR) should follow EBTS guidelines for these fields. Information item values shall be populated as follows:

- DOM 1.013
    - DNM=NORAM
    - DVN=EBTS 10.0
- APS 1.016
    - APO=NGI
    - APN=IRP
    - APR=1.0

4.2 Type-2 — User-Defined Descriptive Text Record

Type-2 logical records shall contain user-defined textual fields providing identification and descriptive information associated with the subject of the transaction. Data contained in this record shall conform in format and content to the specifications of the domain name(s) as listed in the required Fields Domain Name (DOM, 1.013) and Application Profile Specifications (APS, 1.016) found in the Type-1 record.

Type-2 textual information shall be represented in an American Standard Code for Information Interchange (ASCII) format. This record may include such information as the state or FBI numbers, physical characteristics, demographic data, and the subject's criminal history. Every transaction must contain a Type-2 Record, the contents of which are dependent upon the entry in the Type-1 Record, Type of Transaction (TOT 1.004) Field. Sections 5 and Appendix C of this document contain further details on TOTs and their associated Type-2 Records.

Refer to ANSI/NIST-ITL 1-2011 Section 8.2 for introductory information related to a Type-2 Record, and to Appendix C (Type-2 Data Dictionary) of the latest version of the FBI EBTS for a detailed description of the fields used within a Type-2 record. Appendix C of this IP Technical Specifications document indicates which Type-2 fields are used by each Type of Transaction (TOT) that is applicable to the Iris Pilot.

4.3 Type-10 — Facial, Other Body Part, and SMT Image Record

Type-10 image records shall contain and be used to exchange image data and related information pertaining to the face; scars, (needle) marks, and tattoos (SMT); and other body parts. For the Iris Pilot, only frontal Facial Images will be accepted in this record.

Within a Type-10 logical record, entries shall be provided in numbered fields. Table 51 of ANSI/NIST-ITL 1-2011 provides a detailed list of the fields associated with a Type-10 logical record. Associated with each field is the field number, the field mnemonic and name, "condition" code, character type and number of characters permitted, value constraints, and occurrence limits. Refer to ANSI/NIST-ITL 1-2011 Section 8.10 and Appendix K of the latest version of the FBI EBTS for a detailed description of the fields used within a Type-10 record.

4.4 Type-17 — Iris Image Record

The Type-17 Record type specifies interchange formats for biometric authentication systems that utilize iris recognition. It shall contain and be used to exchange iris image data using the mandatory fields of this record type. Optional fields may be used to exchange additional information available in the *INCITS 379-2004 – Iris Image Interchange Format standard* and the *ISO/IEC 19794-6 Iris Image Data Interchange Format Standard*. Images may be monochrome or color with 256 or more intensity levels (gray or per-color component), and vary in size depending on field of view and compression.

Table 75 of ANSI/NIST-ITL 1-2011 provides a detailed list of the fields associated with a Type-17 logical record. Associated with each field is the field number, the field mnemonic and name, "condition" code, character type and number of characters permitted, value constraints, and occurrence limits. Refer to ANSI/NIST-ITL 1-2011 Section 8.17 for a detailed description of the fields used within a Type-17 record.

4.4.1 Iris Record Configuration

The Iris Pilot accepts two different configurations for the Type-17 Iris Record. One is used when an iris image is present and the other when an image is absent. Samples of each are provided in 6C.4 Type-17 Record Samples.

4.4.2 Iris Image Storage Format[6]

The permissible iris image formats all store sampled pixel data from rectilinear images. The data shall be encoded as a raw array of intensity values, a raw array of red-green-blue color values, or as lossless- or lossy-compressed versions thereof. Two of the formats are specialized for small record sizes; these are achieved by cropping and masking the images to support efficient compression (see ANSI/NIST-ITL Section 8.17.30 **Field 17.032: Iris storage format / ISF**). The specific image format to be used by a given IP participant will depend on the participant's current iris capture system (if any) and the performance requirements of the use case to be implemented.

4.4.3 Iris Image Compression[7]

Iris images may be either uncompressed or compressed. The compression code shall be one of the following, entered in **Field 17.011: Compression algorithm/CGA**:

- NONE – An entry of "NONE" indicates that the data contained in this record is uncompressed. The image shall be represented as an array of *n* rows by *m* columns. Each pixel in a monochrome image shall be represented by eight or more bits. Color images shall be represented as a sequential sample of a red, green, and blue intensity for each pixel (if using RGB - See **Section 7.7.10.3** of NIST Special Publication 500-290 -- *ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information*). The image shall be organized in row-major order, with the lowest address corresponding to the upper left corner of the image.
- Portable Network Graphics (PNG) – This supports lossless compression. PNG is formally standardized (*ISO/IEC 15948*) and implementations are freely available.[8]
- JPEG 2000 ISO/IEC 15444-1 [Lossy] (JP2) and JPEG 2000 ISO/IEC 15444-1 [Lossless] (JP2L) - As with other biometrics, while lossless compression is preferred, iris images can be lossily-compressed. The image type (**Field 17.032: Iris storage format / ISF**) should be selected appropriately, and the compression ratio should be set to satisfy some known quantified storage or transmission bandwidth limitation.

Note that the baseline JPEG algorithm (*ISO/IEC 10918*) is no longer acceptable for iris images and shall not be used; it has been shown to increase false match rates due to the presence of tiling artifacts.

No compression or lossless compression is preferred to preserve maximal image quality. MITRE and NIST are conducting an evaluation to determine a JPEG2000 image compression profile for iris images such that there is no measurable loss in matcher performance, or the loss is negligible and acceptable for the intended application (e.g., rapid transmission of a probe image).

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[6] For further details, see NIST Special Publication 500-290 -- ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information, Section 8.17.30, pp. 260-261.

[7] From NIST Special Publication 500-290 -- ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information, Section 7.7.9.2, p. 76.

[8] See http://www.libpng.org/pub/png/libpng.html

If the use of no compression or lossless compression is not feasible, then the recommendations of this evaluation should be followed.[9]

4.4.4 Iris Image Eye Color[10]

Most iris image submissions to the IP use the near-infrared effective acquisition spectrum (17.025 value "NIR") and therefore have a color space of grayscale (17.013 value "GRAY"). The specified eye color for a Type-17 record is the eye color as it appears in the captured image. When the image color space is "GRAY" the eye color should be set to "XXX" for unknown.

4.4.5 Iris Image Effective Acquisition Spectrum[11]

The IP only accepts the values of "NIR", "VIS", "RED", and "UNDEFINED". The value of "DEFINED" shall not be used for IP submissions. Most transactions are expected to use the value "NIR" while some investigative searches may use the value "VIS".

[9] *Iris Compression – Effects of JPEG2000 Compression on Iris Identification*, briefing slides, The MITRE Corporation, 9 October 2012, limited distribution.

[10] For further details, see NIST Special Publication 500-290 -- ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information, Section 8.17.19, pp. 257.

[11] For further details, see NIST Special Publication 500-290 -- ANSI/NIST-ITL 1-2011 — Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information, Section 8.17.24, pp. 258-259.

5 TYPES OF TRANSACTIONS (TOT)

All Iris Pilot transactions must be FBI EBTS compliant with exceptions noted in this document. Sections 5 and Appendix C of this Iris Pilot technical specification describe the FBI EBTS fields that will be used for each iris-related TOT's Type-2 record. Only "traditional" tagged-field EBTS transactions will be accepted during this pilot.

The primary method of Iris Enrollment will be through submission of NGI Criminal Tenprint Identification Transactions which include Type-17 Iris Records. Please refer to EBTS for the specifications for these Identification Service TOTs and this specification for the Type-17 iris image records format.

Table 5-1 summarizes, by NGI service category, the correspondence between requested IP service TOTs and their response and error TOTs. TOT overviews follow the table.

Table 5-1 Summary of Iris-Related Transactions

Transaction	Submission/Request TOT	Response TOT	Error TOT
Identification Service			
Iris Image Identification Search Request	IIDS	SRE	ERRB
Information Service			
Biometric Image/Feature Retrieval Request	IRQ	IRR ISR	ERRI
Investigation Service			
Iris Image Investigation Search Request	IIIS	SRB	ERRB
Data Management Service			
Biometric Image Submission (used for iris image submission)	FIS	FISR	ERRA
Biometric Delete Request	BDEL	BDELR	ERRA

5.1 Transaction Overviews

The iris related transactions that pertain to the Iris Pilot are described in the following subsections. NGI Criminal Tenprint Identification Transactions, used for Iris Enrollment, are described in detail in EBTS.

5.1.1 Identification Service

5.1.1.1 IIDS – Iris Image Identification Search Request

The IIDS transaction allows the user to submit the right and left iris images for a given individual to be used for searching against the IP Repository for a possible match. In the event that only one iris image is submitted, the reason for such occurrence shall be provided using Type-17 field 17.028 and field 17.999 shall then be absent for the pertinent eye. All searches of the IP Repository will be one-to-many searches. An IIDS that results in a score better than the predetermined match threshold will be deemed a match. In the event of a match, information pertaining to the matched individual will be returned in an SRE transaction. If the IIDS contains any errors, a Biometric Transaction Error (ERRB) will be returned.

An IIDS search will also initiate a cascaded search of the FBI's NCIC using the matched subject's FBI Number/UCN (FBI 2.014). If existing NCIC data is located, the IP will include limited data fields from the relevant NCIC file(s) within the SRE response to facilitate officer safety.

SRE – Submission Results – Electronic

For the Iris Pilot IIDS transaction, the SRE transaction denotes whether or not there is a match for either one or both iris images. If there is a match, the SRE will contain the matched identity's UCN, and master name (NAM 2.018), plus additional information about the subject record. By default, an SRE associated with a match will not return any images unless requested in the Request Photo Record (RPR 2.096) field. If the identification transaction results in identification to an existing UCN, the Biometric Image Available (BIA 2.2031) field is returned in the SRE to indicate what biometric types are on file for the identity, in support of subsequent image requests (IRQs) by the user. If Applicable, this transaction may also include the Supplementary Identity Information (SII 2.2023) field, which contains officer safety information retrieved from NCIC, such as outstanding warrants and caution codes.

If neither iris image resulted in a match, the SRE will contain the name submitted (NAM 2.018), and the State ID (SID 2.015), if submitted.

In the unlikely event that multiple candidates score better than the iris match threshold, this occurrence will be flagged for follow-up and analysis by CJIS staff.

If a single iris fails to template on a dual iris search, an IRP003 – "Unable to generate template" error message will be returned in a message field (2.060 MSG) with the failed eye label. See C.1.4 (example SRE) for format. The search should be resubmitted with better iris images.

ERRB – Biometric Transaction Error Response

An ERRB transaction is returned to the submitting agency when an IIDS transaction is rejected because a data field(s) does not pass internal editing criteria. Each reason for rejection will be detailed in the Status/Error Message (MSG 2.060) field. Up to 11 errors for a transaction can be recorded in the MSG field. If the error is related to a field that contains invalid data, the field tag and first 30 characters of the data in the invalid field will be returned. Table 5-5 Transaction Errors Pertinent to the Iris Pilot contains error messages pertinent to iris-related transactions. See the Error Message Format Section (Appendix M) in the FBI EBTS for a complete list of transaction error messages.

5.1.2 Information Service

5.1.2.1 IRQ – Biometric Image/Feature Retrieval Request

This description of the IRQ is specific to Iris Pilot functionality. EBTS describes the IRQ functionality for NGI.

This transaction enables users to retrieve images from the IP Repository. Only iris and face images within the IP Repository may be retrieved. The requester identifies the subjects whose biometric images are being requested via the Subject Identifier (2.2028a SI) which is always the FBI Number/UCN for IP transactions. The complete image set may be requested or additional parameters may be included to specify particular, image types or image sets of the subjects. Up to 1,000 subject records may be requested per transaction. Each subject identifier number in the request and each set of biometrics being returned for the subject will be addressed in a separate Image Request Response (IRR).

If the request contains any invalid field values or is missing any required fields, an Information Error Response (ERRI) will be returned, including the reason for the return in the Status/Error Message (2.060 MSG) field. Errors associated with individual subject identifier numbers, such as an image set not being on file, will be reported in the MSG field of the Image Summary Response (ISR).

The Biometric Image Description (2.2028 BID) is used to support multiple biometric sets and multiple image types for an identity. The BID field is a set type that allows users greater flexibility in defining what images are requested. Please see EBTS Appendix C, Type-2 Element Data Dictionary, for a full description of the use of BID.

Table 5-2 Expected Results from Populating BID Information Items

IRQ Included 2.2028 BID Fields	Result Response
SI	Most recent iris images and most recent face image One IRR per SI
SI and IMT	Most recent images of type IMT One IRR per SI
SI and BSI	Event images (Iris or Face) One IRR per SI
SI, IMT, ELR (where IMT=11 for iris)	Most recent iris image for requested Eye Label One IRR per SI
SI, BSI, ELR (where IMT=11 for iris)	Event iris image for requested Eye Label One IRR per SI

IRR –Image Request Response

This transaction is returned by the FBI/CJIS to provide requested images on file in the IP Repository to the requester. Each image set identified in the IRQ request will cause a separate IRR response. The response will include the subject record identifier number (2.014 FBI/UCN) and the requested image set.

The IRR response will return one biometric image set. The new Biometric Image Available (2.2031 BIA) field is added to reflect the biometric image types available for the Identity. The IMT field in the IRR corresponds to the IMT within the BID field in the request or is equivalent to the image type of the BSI requested (for event results, where BSI is included in the request).

ISR - Image Summary Response

This transaction is returned by the FBI/CJIS to summarize the results of the IRQ request processing. This transaction contains the listing of each subject identifier number whose imagery was successfully returned in the FBI Number/UCN (2.014 FBI) field. The length of this list corresponds with the number of IRRs returned in response to a given IRQ. For each subject record identifier for which images were not returned due to invalid subject record identifier number (~~FBI Number/UCN)~~ or image not on file, the subject identifier and the appropriate error message are returned in the Status/Error Message (2.060 MSG) field.

The user is informed of all the biometric sets that were returned for the identity through the Image Type (2.062 IMT) to specify the type of biometric set returned and the Biometric Set Identifier (2.2029 BSI) to specify the exact biometric set returned if the set is not a composite set. The subject FBI Number/UCN, SID, IMT, and BSI fields are all presented in the same order, such that each occurrence of the field corresponds with the same ordered element of the other fields (e.g., the third UCN/SID listed corresponds to the third instance of the IMT and the third instance of the BSI).

ERRI – Information Error Response

An ERRI transaction is returned to the submitting agency when an IRQ transaction is rejected because a data field(s) does not pass internal editing criteria. Each reason for rejection will be detailed in the Status/Error Message (MSG 2.060) field. Up to 11 errors for a transaction can be

recorded in the MSG field. If the error is related to a field that contains invalid data, the field tag and first 30 characters of the data in the invalid field will be returned. Table 5-5 Transaction Errors Pertinent to the Iris Pilot contains error messages pertinent to iris-related transactions. See the Error Message Format Section (Appendix M) in the FBI EBTS for a complete list of transaction error messages.

5.1.3 Investigation Service

5.1.3.1 IIIS – Iris Image Investigation Search Request

The IIIS serves the purpose of allowing searches related to investigations. For example, such images may be extracted from a visible light facial photo obtained under less than ideal conditions, such as iris images from photos taken from video surveillance. This transaction will allow the user to submit a single iris image, either right, left, or unknown, for a given individual to be used for searching against the IP Repository for a list of possible candidates. While images submitted as part of an IIDS transaction are expected to be of good quality, images submitted with an IIIS transaction are likely to be of relatively poor quality. An IIIS transaction will result in an SRB transaction with the best scoring candidates, up to the value of the Number of Candidates Returned (2.079 NCR) field (for the pilot, maximum=50). The enrolled iris image potentially matched with each candidate will be returned. Facial images will not be returned but may be requested via the IRQ transaction. If the IIIS contains any errors, an ERRB will be returned.

SRB – Search Results Biometric

For the Iris Pilot IIIS transaction, the SRB response denotes if there are potential candidates for the probe iris image. The SRB includes a candidate list (CNL 2.2033) of Subject Identifiers (SIs) up to the number of candidates specified in the Number of Candidates Returned (NCR 2.079) field of the search message. For the IP, the minimum NCR value is 2, the maximum NCR value is 50, and the default NCR value is 20. The first Type-17 record in the SRB contains the probe iris image and associated data. The potentially matched iris image enrolled for each candidate will be returned along with the SI and master name (NAM), plus additional candidate information. Because probe iris images are searched against all iris images in the IP Repository, regardless of labeled eye position, candidate iris images may not have the same Eye Label (ELR) position as the probe image. Facial images will not be returned for an IIIS transaction. If the enrolled facial image is available, and is desired for one or more of the candidates in the candidate list, such images can be requested with the IRQ transaction using the information provided in the Biometric Image List (BIL 2.2073) field. If there are no candidates available, an SRB will be returned with NCR = 0.

ERRB – Biometric Transaction Error Response

An ERRB transaction is returned to the submitting agency when an IIIS transaction is rejected because a data field(s) does not pass internal editing criteria. Each reason for rejection will be detailed in the Status/Error Message (MSG 2.060) field. Up to 11 errors for a transaction can be recorded in the MSG field. If the error is related to a field that contains invalid data, the field tag and first 30 characters of the data in the invalid field will be returned. Table 5-5 Transaction

Errors Pertinent to the Iris Pilot contains error messages pertinent to iris-related transactions. See the Error Message Format Section (Appendix M) in the FBI EBTS for a complete list of transaction error messages.

5.1.4 Data Management Service

5.1.4.1 FIS –Biometric Image Submission

Iris images and an accompanying face image may be added to an existing Identity in the IP Repository through the submission of an FIS transaction, as outlined in this Document. Iris images of an individual may be submitted of either one or both eyes; however, in the event that only one iris image is submitted, the reason for such occurrence shall be provided using Type-17 field 17.028 and field 17.999 shall then be absent for the pertinent eye. Each iris set should be accompanied by a frontal facial photo if at all possible. Inclusion of photos that are not frontal facial photos will result in a rejection of the transaction. The FIS transaction does not require accompanying tenprints, therefore an agency must have an MOU in place with the FBI/CJIS prior to sending such FIS transactions. Since the IP is not connected to the fingerprint matching capability in NGI, iris-only or iris-and-face-only FIS transactions will be provided for via the MOU. The iris and face images will be stored in the IP repository for searching of iris images only. The Pilot will respond with a Biometric Image Submission Response transaction (FISR) to indicate successful receipt and storage of the images.

Bulk Enrollments

For bulk enrollments, such as for multiple image sets stored on a compact disc, one FIS transaction must be generated for each iris-face image set to be enrolled in the IP Repository.

FISR – Biometric Image Submission Response

This transaction will be sent by the IP to the requester to indicate successful receipt and storage of the iris images.

If a single iris fails to template on a dual iris enrollment, an IRP003 – "Unable to generate template" error message will be returned in a message field (2.060 MSG) with the failed eye label. See C.1.2 (example FISR) for format. The enrollment should be resubmitted (via FIS) with better iris images.

ERRA – Administrative Error Response

This transaction is returned by the FBI to indicate a transaction error. It includes a message field (MSG 2.060) indicating the type of error detected. When a transmission is rejected because a data field(s) does not pass internal editing criteria, an error response will be transmitted back to the submitting agency. Each reason for rejection will be detailed in the Status/Error Message (MSG 2.060) field. Up to 11 errors for a transaction can be recorded in the MSG field. MSG will contain an error description relating to the specific discrepancy identified. If the error is related to a field that contains invalid data, the field tag and first 30 characters of the data in the invalid field will be returned. If any mandatory data are missing the transaction will be rejected. Table 5-5 Transaction Errors Pertinent to the Iris Pilot contains error messages pertinent to iris-related

transactions. See the Error Message Format Section (Appendix M) in the FBI EBTS for a complete list of transaction error messages.

5.1.4.2 BDEL - Biometric Delete Request

This transaction allows the user to request deletion of a specific biometric set (face and/or iris images) which they own from the IP repository. The owner is defined as the CRI who enrolled the biometric. The requestor must specify the appropriate identifiers of the images to be removed. The FBI Number/UCN (2.014 FBI) and Biometric Set Identifier (2.2029 BSI) are used to specify the image set or photo being deleted.

BDELR –Biometric Delete Response

The Biometric Delete Response (BDELR) transaction is returned when a successful Biometric Delete Request was completed. If any permission or processing errors are encountered, an error transaction (ERRA) is returned instead.

ERRA – Administrative Error Response

This transaction is returned by the Pilot to indicate a transaction error. It includes a Status/Error Message field (MSG 2.060) indicating the type of error detected, up to a maximum of 11 errors. If the error is related to a field that contains invalid data, the field tag and first 30 characters of the data in the invalid field will be returned. Table 5-5 Transaction Errors Pertinent to the Iris Pilot contains error messages pertinent to iris-related transactions. See the Error Message Format Section (Appendix M) in the FBI EBTS for a complete list of transaction error messages.

5.2 Example Transaction Usage

Table 5-3 Example Uses of Iris-Related Transactions summarizes use of iris-related transactions pertaining to the pilot implementation and use cases described in section 2.1.

Table 5-3 Example Uses of Iris-Related Transactions

User/Use Case	FBI/CJIS Function	Transaction Type (TOT)					Notes
		Enroll (1:1)	Search (1:N) (Identification)	Search (1:N) (Investigation)	Response	Error	
Correctional Facility (Entry / Egress)	Enroll inmate	CAR CNA			SRE, FISR[12]	ERRT ERRA[13]	Establish Criminal Identity complete with iris records.
	Enroll inmate iris	FIS			FISR	ERRA	For pilot – new or existing inmate
	Search inmate iris		IIDS		SRE	ERRB	Establish identity for re-entry and egress; ensure no wants or warrants
Supervised Release / Probation Officer	Search individual's iris		IIDS		SRE	ERRB	Establish identity of individual checking in; ensure no wants or warrants
Court Official	Search individual's iris		IIDS		SRE	ERRB	Establish identity of individual appearing in court
Surveillance Video	Search investigation iris			IIIS	SRB	ERRB	Find candidates for individual appearing in a surveillance video

[12] FISR and ERRA are only returned for a NGI Criminal Tenprint Identification Submission when Type-17 iris images are included and forwarded to the Iris Pilot.

5.3 Transaction and Record Sets

Table 5-4 Record Set Requirements Summary by TOT for the Iris Pilot provides a summary of record set requirements by TOT applicable to the Iris Pilot.

Table 5-4 Record Set Requirements Summary by TOT for the Iris Pilot

Transaction	TOT	Type-1	Type-2	Type-10	Type-17
Biometric Image/Feature Retrieval Request	IRQ	1	1		
Image Request Response	IRR	1	1	0-1	0-2
Image Summary Response	ISR	1	1		
Iris Image Identification Search Request	IIDS	1	1		2
Search Results Electronic	SRE	1	1	0-1	
Biometric Image Submission	FIS	1	1	0-1	2
Biometric Image Submission Response	FISR	1	1		
Iris Image Investigation Search Request	IIIS	1	1		1
Search Results Biometric	SRB	1	1		0-51
Biometric Delete Request	BDEL	1	1		
Biometric Delete Request Response	BDELR	1	1		
Administrative Error Response	ERRA	1	1		
Biometric Transaction Error Response	ERRB	1	1		
Information Transaction Error Response	ERRI	1	1		

Appendix C provides a detailed mapping of the Type-2 fields for each TOT applicable to the Iris Pilot.

5.4 Error Messages

The transaction error responses pertinent to the Iris Pilot are ERRA, ERRB, and ERRI. Refer to Appendix M in the latest version of the FBI EBTS for details about error messages. Table 5-5 Transaction Errors Pertinent to the Iris Pilot shows the IP error messages that pertain to iris related transactions. (These are subject to the EBTS Review Cycle and are subject to change.)

Table 5-5 Transaction Errors Pertinent to the Iris Pilot

Code	Error Condition	MDD Error Description	Count	Insert #1	Insert #2
A0004	Unauthorized EBTS Transaction	Requestor is not authorized for transaction type %1.	1	TOT of incoming message	
B0002	Corrupt image	The submitted image is corrupted.	0		
E0001	Required element missing	Mandatory element %1 was not supplied in message.	1	Element Name	
E0002	Element failed validation	Element %1, with value of [%2] contains invalid data.	2	Element Name	Element Value
E0003	Element failed validation	Element %1, with value of [%2] contains invalid data. The data may not comply with the acceptable range of values.	2	Element Name	Element Value
E0004	EBTS record parse error	EBTS logical record type %1 containing IDC of [%2] in message does not comply with message Contents or Length field values or the record is not parseable.	2	Logical Record Type	IDC value or the value -1 if the named logical record is missing or is a Type-1 record.
E0005	EBTS field parse error	EBTS field %1 could not be parsed. Check use of separator characters and presence of all required subfields.	1	Field Tag	
E0012	Message Length Inconsistent	The length of the CJIS WAN message is inconsistent with the sum of the lengths of the logical records contained within it.	0		
L0002	Subject does not exist in repository	Subject with identifier %1 does not exist in repository.	1	FBI [UCN]	
L0006	Invalid image type	The supplied image(s) could not be used for characterization of subject.	0		
L0013	General Logic Error	A general logic error was detected that is not currently defined. Optional error message: %1	1	Free text	
L0151	Photo not available	Photo Not Available	0		
IRP001	Invalid Eye Position combination	The submitted Eye Positions do not logically correspond.	0		

Code	Error Condition	MDD Error Description	Count	Insert #1	Insert #2
IRP002	Invalid Image Identity Association	The submitted search requires CJIS to adjudicate image.			
IRP003	Unable to generate template	A template could not be created for the submitted image %1 %2.	0-2	Element Name	Element Value
IRP004	Missing iris images	The submitted search requires at least one iris image. No images provided.	0		

6 FBI/CJIS POINT OF CONTACT

Table 6-1 lists the CJIS Division point of contact for the Iris Pilot.

Table 6-1 FBI Point of Contact

Name	Area	Phone	E-Mail
Justin Smith	Biometric Center of Excellence	(304) 625-5333	justin.smith@ic.fbi.gov

APPENDIX A: ACRONYMS

List of Acronyms used within this document.

ANSI	American National Standards Institute, Inc.
APS	Application Profile Specifications
ASCII	American Standard Code for Information Interchange
BDEL	Biometric Delete Request
BDELR	Biometric Delete Response
BIA	Biometric Image Available
BID	Biometric Image Description
BIL	Biometric Image List
BSI	Biometric Set Identifier
CAR	Criminal Tenprint Submission [Answer Required]
CJIS	Criminal Justice Information Services
CAN	Criminal Tenprint Submission [No Answer Necessary]
CNL	Candidate Investigative List
DOM	Domain Name
DPR	Date Printed
EBTS	Electronic Biometric Transmission Specification
ERRA	Administrative Error Response
ERRB	Biometric Transaction Error Response
ERRI	Image/Information Error Response
ERRT	Tenprint Transaction Error Response
EVI	Event Identifier
FBI	Federal Bureau of Investigation
FIS	Biometric Image Submission
FISR	Biometric Image Submission Response
IAFIS	Integrated Automated Fingerprint Identification System
IAP	Iris Acquisition Profile
IIIS	Iris Image Investigation Search Request
IIDS	Iris Image Identification Search Request
IMT	Image Type
IP	Iris Pilot
IREX	Iris Exchange [technical evaluation program at NIST]
IRQ	Biometric Image/Feature Retrieval Request
IRR	Image Request Response
ISF	Image Storage Format
ISR	Image Summary Response
ISO	International Standards Organization
JPEG	Joint Photographic Experts Group
MIME	Multipurpose Internet Mail Extensions
MITRE	The MITRE Corporation
MOU	Memorandum of Understanding

MSG	Status/Error Message
NCR	Number of Candidates Returned
NGI	Next Generation Identification
NIR	1. Near-infrared 2. Number of Images Requested
NIST	National Institute of Standards and Technology
ORI	Originating Agency Identifier
PNG	Portable Network Graphics
RGB	Red, Green, Blue Color Model
RPR	Request Photo Record
SAP	Subject Acquisition Profile
SIB	State Information Bureau
SII	Supplementary Identity Information
SMT	Scars, Marks, and Tattoos
SMTP	Simple Mail Transfer Protocol
SRB	Search Results Biometric
SRE	Search Results Electronic
TOT	Type of Transaction
UCN	Universal Control Number
WAN	Wide Area Network
XML	Extensible Markup Language

APPENDIX B: REFERENCES

[ANSI/NIST-ITL] NIST Special Publication 500-290 -- ANSI/NIST-ITL 1-2011 — *Data Format for the Interchange of Fingerprint, Facial, & Other Biometric Information*, approved November 2011, http://Fingerprint.NIST.Gov/Standard/

[FBI EBTS] FBI CJIS *Electronic Biometric Transmission Specification* (EBTS), Latest Version https://fbibiospecs.org/ebts.html

[IREX I] Grother, P., Tabassi, E., Quinn, G. W. and Salamon, W., *IREX I – Performance of Iris Recognition Algorithms on Standard Images*, NIST Interagency Report 7629, October 30, 2009, http://biometrics.nist.gov/cs_links/iris/irex/irex_report.pdf.zip

[IREX II] Tabassi, E., Grother, P., and Salamon, W., *IREX II – Iris Quality Calibration and Evaluation – Performance of Iris Image Quality Assessment Algorithms*, NIST Interagency Report 7629, September 30, 2011, http://biometrics.nist.gov/cs_links/iris/irexII/iqce_report.pdf.zip

[IREX III] Grother, P., Quinn, G. W., Matey, J. R., et al., *IREX III –Performance of Iris Identification Algorithms*, NIST Interagency Report 7836, April 9, 2012, Report: http://biometrics.nist.gov/cs_links/iris/irexIII/IREXIII_full.zip, Appendices: http://biometrics.nist.gov/cs_links/iris/irexIII/IREXIII_appendices.zip

[IREX V] IREX V: Guidance for Iris Image Collection, http://www.nist.gov/itl/iad/ig/irexv.cfm

[IREX V] Quinn, G., Matey, J., Tabassi, E., Grother, P., *IREX V - Guidance for Iris Image Collection*, NIST Interagency Report 8013, July 2, 2014, http://biometrics.nist.gov/cs_links/iris/irexV/IREX_V_Report.pdf

[MOBILE ID] NIST Special Publication 500-280 – *Mobile ID Device Best Practice Recommendation*, Version 1.0, August 2009, http://www.nist.gov/itl/iad/ig/upload/MobileID-BPRS-20090825-V100.pdf

[SC37 FRAMEWORK] ISO/IEC JTC 1/SC 37, 19794-1:2011, Information technology – Biometric data interchange formats – Part 1: Framework, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50862

[SC37 IRIS IMAGE] ISO/IEC 19794-6:2011, Information technology – Biometric data interchange formats – Part 6: Iris image data, http://www.iso.org/iso/iso_catalogue/catalogue_tc/catalogue_detail.htm?csnumber=50868

[SC37 IRIS QUALITY] ISO/IEC JTC 1/SC 37, N4886, CD 29794-6, Biometric sample quality – Part 6: Iris image data (2/17/12, development in progress)

APPENDIX C: SAMPLE IRIS TRANSACTION SEQUENCES

The tables in this section provide sample implementations (using fictitious data) of the following record types and submission and response combinations:

Type-2 Record Samples and Transaction Layouts for:

- BDEL/BDELR
- FIS/FISR
- IIIS/SRB
- IIDS/SRE
- IRQ/IRR/ISR
- ERRI/ERRA/ERRB

Type-1 Record Sample

Type-10 Record Sample

Type-17 Record Samples

- Iris Image Present
- Iris Image Absent

All required Record Types and Fields for each TOT have been illustrated in the Record Sample Transactions. The IP transactions are presented with the fields that are used in the IP. Many of the transactions (e.g. the SRE) have optional fields that are not used in the IP but are used in some CJIS services. These unused optional fields are absent from the tables below for the sake of clarity. Where field values are constant for the IP or special limitations or exceptions apply, the fields are marked and explanatory text accompanies the table.

C.1 Type-2 Record Samples and Transaction Layouts

C.1.1 BDEL/BDELR

BDEL – Biometric Delete Request

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	215
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.014	FBI / UCN	FBI Number / Universal Control Number	*	1	123456789
2.073	CRI	Controlling Agency Identifier	1	3	WVMEDS001
2.2029	BSI	Biometric Set Identifier	*	1	1234567

BDELR –Biometric Delete Request Response

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	215
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.014	FBI / UCN	FBI Number / Universal Control Number	1	25	123456789
2.060	MSG	Status/Error Message	0	1	
2.073	CRI	Controlling Agency Identifier	1	3	WVMEDS001

* This optional field will always be present for Iris Pilot transactions.

C.1.2 FIS/FISR

FIS – Biometric Image Submission (used for iris image submission)

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	215
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.014	FBI / UCN	FBI Number / Universal Control Number	1	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.018	NAM	Name	0	1	DOE,JOHN
2.038	DPR	Date Printed	1	1	19790815
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.2035	EVI	Event Identifier	0	1	987654321
Type-10, Optional					
Type-17, Required (2)					

FISR - Biometric Image Submission Response

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	215
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.014	FBI / UCN	FBI Number / Universal Control Number	1	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.018	NAM	Name	0	1	DOE,JOHN
2.060	MSG	Status/Error Message	0	11	IRP003 A template could not be created for the submitted image ELR: 1.
2.073	CRI	Controlling Agency Identifier	1	3	WVMEDS001
2.2061	BIE	Biometric Image Enrollment	0	61	
a	BSI	Biometric Set Identifier	1	1	1234567
b	IMT	Image Type	1	1	9
c	POS	Subject Pose	0	1	F
d	SMT	Scars, Marks, and Tattoos	0	1	*

[*] This information item will always be empty for Iris Pilot transactions. It is necessary for validation purposes.

C.1.3 IIIS/SRB

IIIS – Iris Image Investigation Search Request

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	215
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.010	CIN	Contributor Case Identifier Number	1	1	
a	CIN_PRE	Contributor Case Prefix	1	1	Investigation No.
b	CIN_ID	Contributor Case ID	1	1	1963BRT715
2.011	CIX	Contributor Case ID Extension	1	1	999
2.017	MNU	Miscellaneous Identification Number	0	4	PP-1234567890P
2.018	NAM	Name	0	1	DOE,JOHN
2.020	POB	Place Of Birth	0	1	AA
2.021	CTZ	Country Of Citizenship	0	10	AA
2.022	DOB	Date Of Birth	0	1	19790815
2.023	AGR	Age Range	0	1	2535
2.024	SEX	Sex	0	1	M
2.025	RAC	Race	0	1	A
2.026	SMT	Scars, Marks, And Tattoos	0	10	TAT ARM
2.028	HTR	Height Range	0	1	400711
2.030	WTR	Weight Range	0	1	175185
2.031	EYE	Eye Color	0	1	MAR
2.032	HAI	Hair Color	0	1	GRN
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.079	NCR	Number Of Candidates Returned	0	1	20
Type-17, Required					

SRB – Search Results Biometric

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.060	MSG	Status/Error Message	0	1	
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.079	NCR	Number Of Candidates Returned	1	1	20
2.088	NOT	Note Field	0	1	The candidate identities returned from an IIIS in the resulting SRB response shall be considered potential candidate matches or investigative leads requiring further verification. Users should not rely solely on IIIS search responses as the impetus for any law enforcement action. Instead, search results serve as potential links between submitted images and true identities that must be independently verified.
2.2010	NIR	Number Of Images Requested	1	1	20
2.2033	CNL	Candidate Investigative List	0	50	
a	SI	Subject Identifier	1	1	123456789
b	NAM	Master Name	1	1	DOE,JOHN
c	BSI	Biometric Set Identifier	1	1	1234567
d	IMT	Image Type	1	1	11
e	FGP	Friction Ridge Generalized Position	0	1	*
f	PPD	Print Position Descriptor	0	1	*
g	MSC	Match Score	1	1	1200
h	BIA	Biometric Image Available	1	1	40
i	NDR	Name of Designated Repository	0	1	*
j	IDC	Information Designation Character	0	1	02
k	NOT	Note Field	0	1	*
l	POS	Subject Pose	0	1	*
m	SMT	NCIC SMT Code	0	1	*
n	ELR†	Eye Label†	0	1	2
2.2073	BIL	Biometric Image List	0	1000	
a	UCN	Subject Identifier	1	1	123456789
b	BSI	Biometric Set Identifier	1	1	12345
c	BCD	Biometric Capture Date	1	1	20140304
d	IMT‡	Image Type‡	1	1	11
Type-17, Optional (up to 51)					

* This information item will always be empty for Iris Pilot transactions. It is necessary for validation purposes.
† The 2.2033 Eye Label (ELR) information item is a special addition to the 2.2033 CNL field for the Iris Pilot.
‡ Only face or iris images are available for the Iris Pilot.

C.1.4 IIDS/SRE

IIDS – Iris Image Identification Search Request

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Image Designation Character	1	1	00
2.006	ATN	Attention Indicator	0	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.009	OCA	Originating Agency Case Number	0	1	Q880312465
2.014	FBI/UCN	FBI Number / Universal Control Number	0	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.017	MNU	Miscellaneous Identification Number	0	4	PP-1234567890P
2.018	NAM*	Name	1	1	DOE,JOHN*
2.073	CRI	Controlling Agency Identifier	1	3	WVMEDS001
2.096	RPR	Request Photo Record	0	1	Y
Type-17, Required (2)					

* The 2.018 NAM field can be programmatically set to “DOE,JOHN” or “DOE,JANE” to reduce operator data entry requirements.

SRE – Search Results Electronic (*example for ident*)

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Image Designation Character	1	1	00
2.006	ATN	Attention Indicator	0	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.009	OCA	Originating Agency Case Number	0	1	Q880312465
2.014	FBI/UCN	FBI Number/ Universal Control Number	0	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.018	NAM	Name	1	1	DOE,JOHN
2.059	SRF	Search Result Findings	1	1	N
2.060	MSG	Status/Error Message	0	11	MATCH MADE AGAINST SUBJECTS IRIS ON 05/01/94.{RS}IRP003 A template could not be created for the submitted image ELR: 2.
2.073	CRI	Controlling Agency Identifier	1	3	WVMEDS001
2.088	NOT*	Note Field	1	1	This response is based on a search of only the Iris Pilot (IP) iris image repository and does not preclude a record from existing in other biometric or name based repositories. Users are permitted to rely on the IP response in conjunction with other law enforcement tools but shall not rely solely on the IP response for additional law enforcement action.
2.2023	SII*	Supplementary Identity Information	0	1	00 – ARMED AND DANGEROUS
2.2031	BIA	Biometric Image Available	0	1	40
2.2035	EVI	Event Identifier	0	1	987654321
Type-10, Optional (by request)					

* The 2.088 NOT and 2.2023 SII fields are special additions to the SRE for the Iris Pilot.

C.1.5 IRQ/IRR/ISR

IRQ – Biometric Image/Feature Retrieval Request

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.2028	BID	Biometric Image Description	*	1000	
a	SI	Subject Identifier (FBI Number / UCN)	1	1	123456789
b	IMT	Image Type	0	1	9
c	BSI	Biometric Set Identifier	0	1	123456789123
d	FNR	Finger Number Requested	0	1	†
e	PPD	Print Position Descriptors	0	1	†
f	POS	Subject Pose	0	1	F
g	SMT	NCIC SMT Code (Scar, Mark, Tattoo)	0	1	†
h	ELR‡	Eye Label‡	0	1	1

* This optional field will always be present for Iris Pilot transactions.
† This information item will always be empty for Iris Pilot transactions. It is necessary for validation purposes.
‡ The 2.2028h Eye Label (ELR) information item is a special addition to the 2.2028 BID field for the Iris Pilot.

IRR – Image Request Response

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.014	FBI/UCN	FBI Number / Universal Control Number	1	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.018	NAM	Name	0	1	DOE,JOHN Q
2.036	PHT	Photo Available Indicator	0	1	Y
2.062	IMT	Image Type	0	1	11
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.2029	BSI	Biometric Set Identifier	0	1	123456789123
2.2031	BIA	Biometric Image Available	0	1	40
Type-10, Optional					
Type-17, Optional (up to 2)					

ISR – Image Summary Response

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	1	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.014	FBI/UCN	FBI Number / Universal Control Number	0	1000	123456789
2.015	SID	State Identification Number	0	1000	NY12345678
2.060	MSG	Status/Error Message	0	1000	
2.062	IMT	Image Type	0	1000	11
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001
2.2029	BSI	Biometric Set Identifier	0	1000	123456789123

C.1.6 ERRI/ERRA/ERRB

ERRI – Information Error

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Information Designation Character	1	1	00
2.006	ATN	Attention Indicator	0	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.014	FBI/UCN	FBI Number/ Universal Identification Number	0	1	123456789
2.015	SID	State Identification Number	0	1	NY12345678
2.060	MSG	Status/Error Message	1	11	L0002 Subject with identifier 123456789 does not exist in repository.
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001

ERRA – Administrative Error

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Image Designation Character	1	1	00
2.006	ATN	Attention Indicator	0	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.060	MSG	Status/Error Message	1	11	E0012 The length of the CJIS WAN message is inconsistent with the sum of the lengths of the logical records contained within it.
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001

ERRB – Biometric Transaction Error

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1, Required					
Type-2, Required					
2.001	LEN	Logical Record Length	1	1	405
2.002	IDC	Image Designation Character	1	1	00
2.006	ATN	Attention Indicator	0	1	TEST
2.007	SCO	Send Copy To	0	9	WVMEDS001
2.010	CIN	Contributor Case ID Number	0	5	
a	CIN_PRE	Contributor Case Prefix	1	1	Investigation No.
b	CIN_ID	Contributor Case ID	1	1	1963BRT715
2.011	CIX	Contributor Case ID Extension	0	5	999
2.017	MNU	Miscellaneous Identification Number	0	4	PP-1234567890P
2.060	MSG	Status/Error Message	1	11	IRP003 A template could not be created for the submitted image ELR: 2.
2.073	CRI	Controlling Agency Identifier	0	3	WVMEDS001

C.2 Type-1 Record Sample

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-1					
1.001	LEN	Logical Record Length	1	1	122
1.002	VER	Version Number	1	1	0500*
1.003	CNT	File Content	1	1	
	FRC	First Record Category Code	1	1	1*
	CRC	Content Record Count	1	1	01
	REC	Record Category Code	1	99	02
	IDC	Information Designation Character	1	99	00
1.004	TOT	Type of Transaction	1	1	SRE
1.005	DAT	Date	1	1	20101025
1.006	PRY	Transaction Priority	0	1	1
1.007	DAI	Destination Agency ID	1	1	WVMEDS001
1.008	ORI	Originating Agency ID	1	1	WVMEDS002
1.009	TCN	Transaction Control Number	1	1	DUMMYTCN_DUMMYTCN
1.010	TCR	Transaction Control Reference	0	1	DUMMYTCR_DUMMYTCR
1.011	NSR	Native Scanning Resolution	1	1	00.00*
1.012	NTR	Nominal Resolution	1	1	00.00*
1.013	DOM	Domain Name	1	1	
a	DNM	Domain Name	1	1	NORAM*
b	DVN	Domain Version Number	1	1	EBTS 10.0*
1.016	APS†	Application Profile Specifications	†	1	
a	APO	Application Profile Organization	1	1	NGI*
b	APN	Application Profile Name	1	1	IRP*
c	APV	Application Profile Version Number	1	1	1.0*

* Denotes constant value for Iris Pilot.

† This field/IP values must not be used for NGI Criminal Tenprint Transactions (e.g. CAR) with Type-17 iris images. It is required for all other Iris Pilot submissions (i.e. FIS, IIDS, IIIS, BDEL, IRQ) and responses.

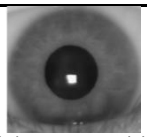
C.3 Type-10 Record Sample

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-10					
10.001	LEN	Logical Record Length	1	1	40228
10.002	IDC	Image Designation Character	1	1	02
10.003	IMT	Image Type	1	1	FACE
10.004	SRC	Source Agency/ORI	1	1	WVMEDS001
10.005	PHD	Photo Date	1	1	20101025
10.006	HLL	Horizontal Line Length	1	1	480
10.007	VLL	Vertical Line Length	1	1	600
10.008	SLC	Scale Units	1	1	1
10.009	THPS	Transmitted Horizontal Pixel Scale	1	1	1
10.010	TVPS	Transmitted Vertical Pixel Scale	1	1	1
10.011	CGA	Compression Algorithm	1	1	JPEGB
10.012	CSP	Color Space	1	1	SRGB
10.013	SAP	Subject Acquisition Profile	1	1	0
10.020	POS†	Subject Pose	*	1	F†
10.999	DATA	Image Data	1	1	

* This optional field will always be present for Iris Pilot transactions.
† Denotes constant value for Iris Pilot.

C.4 Type-17 Record Samples

1. Iris Image **PRESENT**

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-17					
17.001	LEN	Logical Record Length	1	1	35840
17.002	IDC	Image Designation Character	1	1	01
17.003	ELR	Eye Label	1	1	1
17.004	SRC	Source Agency	1	1	WVMEDS001
17.005	ICD	Iris Capture Date	1	1	20101025
17.006	HLL	Horizontal Line Length	1	1	99999
17.007	VLL	Vertical Line Length	1	1	99999
17.008	SLC	Scale Units	1	1	1
17.009	THPS	Transmitted Horizontal Pixel Scale	1	1	1000
17.010	TVPS	Transmitted Vertical Pixel Scale	1	1	1000
17.011	CGA	Compression Algorithm	1	1	NONE
17.012	BPX	Bits Per Pixel	1	1	8
17.013	CSP	Color Space	1	1	GRAY
17.014	RAE	Rotation Angle Of Eye	0	1	4000
17.015	RAU	Rotation Uncertainty	0	1	FFFF
17.016	IPC	Image Property Code	0	1	
a	IHO	Horizontal Orientation Code	1	1	1
b	IVO	Vertical Orientation Code	1	1	1
c	IST	Specific Scan Type	1	1	1
17.017	DUI	Device Unique Identifier	0	1	M0A1B2C3D4E5F
17.019	MMS	Make/Model/Serial Number	1	1	
a	MAK	Make	1	1	GenericIrisVendor
b	MOD	Model	1	1	MidGradeCam
c	SER	Serial Number	1	1	A0a0a0a0
17.020	ECL	Eye Color	0	1	XXX
17.021	COM	Comment	0	1	Free text comments about the record
17.025	EAS*	Effective Acquisition Spectrum	0	1	NIR*
17.031	IAP	Subject Acquisition Profile - Iris	0	1	40
17.032	ISF	Iris Storage Format	0	1	1
17.999	DAT	Data	1	1	 (one iris image – e.g., right eye)

* The value "DEFINED" shall not be used with Iris Pilot submissions.

2. Iris Image **ABSENT**

Field Number	Identifier	Field Name	Occurrences		Example Data
			Min	Max	
Type-17					
17.001	LEN	Logical Record Length	1	1	35840
17.002	IDC	Image Designation Character	1	1	01
17.003	ELR	Eye Label	1	1	1
17.004	SRC	Source Agency	1	1	WVMEDS001
17.005	ICD	Iris Capture Date	1	1	20101025
17.017	DUI	Device Unique Identifier	0	1	M0A1B2C3D4E5F
17.019	MMS	Make/Model/Serial Number	0	1	
a	MAK	Make	1	1	GenericIrisVendor
b	MOD	Model	1	1	MidGradeCam
c	SER	Serial Number	1	1	A0a0a0a0
17.021	COM	Comment	0	1	Free text comments about the record
17.028	DME	Damaged Or Missing Eye	1	1	UC